Michigan Opioid Collaborative

URINE DRUG TESTING – ORDERING AND INTERPRETATION

** Human Urine: T ~98 deg; > 90 deg for 15 min. pH 4.5-8; SG 1.002-1.03. Ur Cr > 20 mg/dL **

THE TESTS

Enzyme linked immunoassay (EIA) kits, clinic point of care tests

- Screening test for illicit substances amphetamine/methamphetamine, (marijuana, PCP, cocaine, "opioids" (morphine/codeine); Some tests may include oxycodone, methadone, buprenorphine
- Inexpensive, fast, point of care or lab
- Detects class of substance, not always specific medication
- Will be negative for hydrocodone, hydromorphone, oxycodone, methadone, buprenorphine, benzodiazepines (particularly clonazepam) unless specific test kit for those meds is in use. *Ask your lab!*
- Significant false positive rates caused by numerous prescribed or OTC meds. False negatives may occur

Gas chromatography/Mass Spectroscopy (GCMS)

- More expensive, labor intensive
- Confirming test identifies specific meds and their metabolites. Use GCMS to confirm patient is taking prescribed meds and not taking non-prescribed meds
- High sensitivity, but you must *tell the lab what you seek (patient is taking)*
- False positives still can occur

Liquid chromatography/Time of Flight testing

- More expensive, labor intensive
- Screening and confirming test identifies specific substances and metabolites.
- Very accurate with low or no false positive/negative results

WHAT TO ORDER

- Test for illicit drug use: EIA or LCSM/Time of flight
- Test to confirm taking prescribed meds: GCMS (EIA is OK if your lab runs the test for each med – they usually do not – *ask!*)
- Test to check for use of non-prescribed medication: GCMS or LCMS

POSSIBLE OUTCOMES OF TESTING

- Presence of illicit substance: Use by patient; false result related to prescribed or OTC med exposure
- Presence of non-prescribed medication: Illicit use by patient; false positive testing – cross-reaction or possible known metabolite (e.g., morphine or codeine may → hydromorphone)
- Absence of prescribed medication: diversion or binging and running out early; false negative (incorrect use of EIA rather than GCMS or LCMS testing); urine adulterated; cut-off problem (the threshold in workplace testing for reporting a positive is set high to avoid false positives that require a job action)

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TESTING REFERENCE

Drug Testing False Positives on EIA not GCMS unless specified
(Illicit use? false positive on screen? known metabolite of prescribed rx?)

- Amphetamines/methamphetamine: bupropion, tricyclic antidepressants, phenothiazines, propranolol, labetalol, OTC cold rx, ranitidine, metformin! selegiline, trazodone, Abilify, phentermine, zolpidem. Vicks Nasal Spray can test positive even on GCMS.
- Barbiturates: phenytoin
- Benzodiazepines: sertraline, zolpidem, NSAIDs?
- LSD: amitriptyline, doxepin, sertraline, fluoxetine, metoclopramide, haloperidol, risperidone, verapamil
- Opioids
    - False positive EIA testing: quinolones (oflox, gati), dextromethorphan, diphenhydramine (Benadryl), doxylamine, rifampin, verapamil, poppy seeds, zolpidem?
    - False positive GCMS testing
        - ✓ Morphine: from codeine, heroin (for a few hours) and poppy seeds for 48 hrs
        - ✓ Hydromorphone: from morphine, codeine, hydrocodone, heroin
        - ✓ Oxycodone: from hydrocodone
        - ✓ Oxymorphone: from hydrocodone
        - ✓ Codeine: from hydrocodone
        - ✓ Methadone: from quetiapine (Seroquel), diltiazem and verapamil (rare); doxylamine, Benadryl (EIA+; methadone metabolites and GCMS neg)
        - ✓ Tramadol: from venlafaxine
        - ✓ Buprenorphine on point of care test: large amount of morphine

- PCP: dextromethorphan, diphenhydramine, doxylamine, NyQuil, tramadol, venlafaxine (Effexor), NSAIDs, imipramine
- Propoxyphene: methadone, cyclobenzaprine (Flexeril), doxylamine (Ny-Quil), diphenhydramine (Benadryl), imipramine
- Cannabinoids (on EIA not GCMS): pantoprazole (Protonix), efavirenz (Sustiva, Atripla), very high dose NSAIDs, promethazine, zolpidem? Baby wash products, Dronabinol tests positive. Nabilone tests negative. Not second hand unless high exposure.
- Cocaine: none

Drug Testing False Negatives on EIA, GCMS if specified
(patient ran out early? Diversion? Cut-off issue? Tampered specimen?)

- Unless bundled *(Ask your lab!)*, opioid immunoassays <u>will miss</u> tramadol, meperidine, oxycodone, oxymorphone, fentanyl, methadone, buprenorphine, and *often hydrocodone*
- Morphine: GCMS may miss it unless glucuronide hydrolyzed. Can pick up LCMS – consult your lab!
- Benzos: Xanax, Ativan, clonazepam
- Illnesses that cause lactic acidosis can cause false negatives
- EIA is sensitive for diazepam, less for other benzos (0% for lorazepam). Clonazepam and alprazolam (Xanax) are *frequently* negative on both EIA and GCMS. They are easily identified by LCMS/Time of Flight testing

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Testing for heroin

Patients taking opioids can be tested specifically for heroin use by looking for one of its specific metabolites): 6-monoacetyl morphine (6-MAM) duration 2-4 hrs (certainly < 8) positive only on GCMS or LCMS/Time of Flight testing; positive as morphine and/or codeine for 2-3 days

Testing for alcohol use

- Urine ethyl glucuronide
- Carbohydrate deficient transferrin: sensitive to ≥4 drinks/d x 1 wk with a half-life of 15 days. Not useful when advanced liver disease present. May give false positives in women when higher cut-offs may be necessary.

For More Information: SAMHSA TIP 63 (pages 2-14 to 2-16) offers more information about testing and interpretations along with treatment implications.